

WHAT IS CLAIMED IS:

1. A solid type EC element having
a substrate,
a lower electrode layer formed on said substrate,
an EC layer formed on said lower electrode layer, and
an upper electrode layer formed on said EC layer,
said lower electrode layer being divided by one or more
parting lines non-linearly formed along the outline of a desired
coloring region so as to surround said coloring region into a
portion for forming a coloring region including said coloring
region and a portion for not forming a coloring region not
including said coloring region in the state said portion for
forming a coloring region and said portion for not forming a
coloring region are not conducted to each other;
layers, which make up said EC layer, and said upper
electrode layer being formed so as to entirely cover said
coloring area; and
said upper electrode layer being not conducted to said
portion for forming a coloring region of said lower electrode
layer, and said upper electrode layer being conducted to said
portion for not forming a coloring region of said lower
electrode layer.
2. The solid type EC element according to claim 1,
wherein said parting line or parting lines makes or make up a

main portion of the outline of said coloring region, and the outer edge of said upper electrode layer makes up the remaining portion of the outline of said coloring region.

3. The solid type EC element according to claim 1, wherein said portion for forming a coloring region possesses a shape characterizing the outward appearance of said coloring region.

4. The solid type EC element according to claim 1, wherein said portion for forming a coloring region of said lower electrode layer has a first region making up the coloring region and a second region, which is continuous with said first, and which extends to the outer edge of said lower electrode layer without making up the coloring region, demarcated by the outer edge position of the upper electrode layer, and

wherein said EC layer is formed in the state where said EC layer covers a portion from the whole of said first region of the portion for forming a coloring region of said lower electrode layer to a part of the second region thereof, and the upper electrode layer covers the whole of the first region of the portion for forming a coloring region of said lower electrode layer and does not covers the second region thereof.

5. The solid type EC element according to claim 1, wherein said substrate is composed of a transparent substrate,

said lower electrode layer is composed of a transparent electrode film, said upper electrode layer is composed of a metal-made reflecting film, said substrate is adhered to a plate material other than the substrate with an adhesive, and said lower electrode layer, said EC layer, and said upper electrode layer are intervened between the substrate and the plate other than the substrate to make up an EC mirror.

6. The solid type EC element according to claim 1, wherein a plate other than the substrate is adhered to said substrate with an adhesive, said lower electrode layer, said EC layer, and said upper electrode layer are intervened between said substrate and the plate other than the substrate, wherein said substrate is composed of a transparent substrate, both of said lower electrode layer and said upper electrode layer are composed of transparent electrodes films, said adhesive is composed of a transparent adhesive, and said plate other than the substrate is composed of a transparent plate to make up a transmitting EC element.

7. The solid type EC element according to claim 1, wherein said substrate is composed of a transparent substrate, said lower electrode layer is composed of a transparent electrode film, said upper electrode layer is composed of a transparent electrode film or a metal-made reflecting film, and said coloring region is formed into a desired shape selected

from among letters, symbols and figures to make up a display element.

8. The solid type EC element according to claim 1, wherein said parting line makes up half or more the total length of the outline of said coloring region.

9. The solid type EC element according to claim 1, wherein said portion for forming a coloring region of the lower electrode layer has a portion narrower than the maximum width of the coloring region, and a portion which is made up of the outer edge of said upper electrode layer amongst the outline of the coloring region is formed on said portion for forming a coloring region where the width is narrower.

10. The solid type EC element according to claim 1, wherein a length of a portion constituted by the outer edge of said upper electrode layer amongst the outline of the coloring region is composed so as to be shorter than the maximum outer size of the coloring region.

11. The solid type EC element according to claim 1, wherein said parting line is formed inside of the outer edge of said substrate along the length longer than the total length of the outer edge of said substrate.

12. A solid type EC element having
a substrate;
a lower electrode layer formed on said substrate;
an EC layer formed on said lower electrode layer; and
an upper electrode layer formed on said EC layer;
said lower electrode layer being divided by one or more
parting lines, which are non-linearly formed along the outline
of a desired coloring region so as to surround said coloring
region, and being formed so that both ends of the lines are
deviated from the outline of said coloring region and extend
to mutually different positions on the outer edge of said lower
electrode layer, into a portion for forming a coloring region
including said coloring region and a portion for not forming
a coloring region not including said coloring region in the
state said portion for forming a coloring region and said
portion for not forming a coloring region are not conducted to
each other; wherein layers, which make up said EC layer, and
said upper electrode layer are formed so as to entirely cover
said coloring area;

the outer edge of said EC layer being entirely formed
outside of said coloring region; wherein the outer edge of said
upper electrode layer at a section which faces to said portion
for not forming a coloring region of said lower electrode layer
is totally formed outside of said coloring region, and at least
part thereof outwardly projecting from said outer edge of the
EC layer, and said upper electrode layer being conducted to said

portion for not forming a coloring region of said lower electrode layer at the portion outwardly projecting from said outer edge of the EC layer;

the outer edge of said upper electrode layer at a section which faces to said portion for forming a coloring region of said lower electrode layer being totally formed at a portion inside of the edge of said EC layer along with the outline of said coloring region;

the outer edge of said upper electrode layer over an appropriate section before and after the position crossing to said parting lines being formed at a portion inside of the outer edge of said EC layer, whereby said upper electrode layer is not conducted to said portion for forming a coloring region of said lower electrode layer; and

the outline of said coloring region being delimited by the outline of a region where all of said portion for forming a coloring region of said lower electrode layer, said layers which make up said EC layer, and said upper electrode layer are overlapped with each other.

13. The solid type EC element according to claim 12, wherein said parting line or parting lines makes or make up a main portion of the outline of said coloring region, and the outer edge of said upper electrode layer makes up the remaining portion of the outline of said coloring region.

14. The solid type EC element according to claim 12, wherein said portion for forming a coloring region possesses a shape characterizing the outward appearance of said coloring region.

15. The solid type EC element according to claim 12, wherein said portion for forming a coloring region of said lower electrode layer has a first region making up the coloring region and a second region, which is continuous with said first, and which extends to the outer edge of said lower electrode layer without making up the coloring region, demarcated by the outer edge position of the upper electrode layer, and

wherein said EC layer is formed in the state where said EC layer covers a portion from the whole of said first region of the portion for forming a coloring region of said lower electrode layer to a part of the second region thereof, and the upper electrode layer covers the whole of the first region of the portion for forming a coloring region of said lower electrode layer and does not covers the second region thereof.

16. The solid type EC element according to claim 12, wherein said substrate is composed of a transparent substrate, said lower electrode layer is composed of a transparent electrode film, said upper electrode layer is composed of a metal-made reflecting film, said substrate is adhered to a plate material other than the substrate with an adhesive, and said

lower electrode layer, said EC layer, and said upper electrode layer are intervened between the substrate and the plate other than the substrate to make up an EC mirror.

17. The solid type EC element according to claim 12, wherein a plate other than the substrate is adhered to said substrate with an adhesive, said lower electrode layer, said EC layer, and said upper electrode layer are intervened between said substrate and the plate other than the substrate, wherein said substrate is composed of a transparent substrate, both of said lower electrode layer and said upper electrode layer are composed of transparent electrodes films, said adhesive is composed of a transparent adhesive, and said plate other than the substrate is composed of a transparent plate to make up a transmitting EC element.

18. The solid type EC element according to claim 12, wherein said substrate is composed of a transparent substrate, said lower electrode layer is composed of a transparent electrode film, said upper electrode layer is composed of a transparent electrode film or a metal-made reflecting film, and said coloring region is formed into a desired shape selected from among letters, symbols and figures to make up a display element.

19. The solid type EC element according to claim 12,

wherein said parting line makes up half or more the total length of the outline of said coloring region.

20. The solid type EC element according to claim 12, wherein said portion for forming a coloring region of the lower electrode layer has a portion narrower than the maximum width of the coloring region, and a portion which is made up of the outer edge of said upper electrode layer amongst the outline of the coloring region is formed on said portion for forming a coloring region where the width is narrower.

21. The solid type EC element according to claim 12, wherein a length of a portion constituted by the outer edge of said upper electrode layer amongst the outline of the coloring region is composed so as to be shorter than the maximum outer size of the coloring region.

22. The solid type EC element according to claim 12, wherein said parting line is formed inside of the outer edge of said substrate along the length longer than the total length of the outer edge of said substrate.

23. A process for producing a solid type EC element comprising:

a film formation stage where a lower electrode layer are formed on a substrate;

a stage where an etching treatment with a laser beam scanning is subjected to a surface of said lower electrode layer to form a parting line so as to surround a desirable coloring region along the outline of the coloring region, whereby the lower electrode layer is divided into a portion forming a coloring region including the coloring region and a portion for not forming a coloring region not including the coloring region in such a manner that they are not conducted to each other;

a stage where layers for making up an EC layer are formed on the lower electrode layer in such a manner that they covers the entire surface of the coloring layer; and

a stage where an upper electrode layer is formed on the EC layer in such a manner that said upper layer covers the whole of the coloring region, and is not conducted to the portion for forming a coloring region of the lower electrode layer and is conducted to the portion for not forming a coloring region of the lower electrode layer.

24. The process for producing a solid type EC element according to claim 23, wherein a plurality of EC elements are formed on one substrate in each stage, and said substrate is cut into each EC element after the completion of each stage.

25. A process for producing a solid type EC element comprising:

a film formation stage where a lower electrode layer are

formed on a substrate;

a stage where an etching treatment with a laser beam scanning is subjected to a surface of the lower electrode layer to form a parting line so as to surround a desirable coloring region along the outline of the coloring region, in a non-linear manner and so that both ends are deviated from the outline of the coloring region and extend to the outer edge of the lower electrode layer at mutually different positions, whereby the lower electrode layer is divided by said parting line into a portion forming a coloring region including the coloring region and a portion for not forming a coloring region not including the coloring region in such a manner they are not conducted to each other;

a stage where a coloring layer and a solid electrolyte layer are formed on the lower electrode layer having said parting line formed thereon using a common mask in such a manner that they covers the entire surface of the coloring region; and

a stage where an upper electrode layer is formed on said EC layer utilizing a mask in such a manner that said upper electrode layer totally covers said coloring region; that the outer edge of said upper electrode layer at a section which faces to said portion for not forming a coloring region of said lower electrode layer is totally formed outside of said coloring region, and a part of said outer edge of said upper electrode layer projecting outside of said outer edge of the EC layer, and said upper electrode layer is conducted to said portion for

not forming a coloring region of said lower electrode layer at the portion projecting outside of said outer edge of the EC layer; and that the outer edge of said upper electrode layer at a section which faces to said portion for forming a coloring region of said lower electrode layer is totally formed inside of the edge of said EC layer along with the outline of said coloring region, whereby said upper electrode layer is not conducted to said portion for forming a coloring region of said lower electrode layer.

26. The process for producing a solid type EC element according to claim 25, wherein a plurality of EC elements are formed on one substrate in each stage, and said substrate is cut into each EC element after the completion of each stage.